IN THE CLAIMS:

These claims will replace all prior versions of claims in the present application.

1. (Currently Amended) A method for calculating an intersection point of a triangle with a line segment, the triangle having three vertexes P_0, P_1, P_2, and the line segment having both ends A and B, comprising:

a coordinate system setting step (A) of setting a coordinate system R in which P_0 is a coordinate origin, P_0P_1 conforms to a first axis (U axis) to have a unit length, P_0P_2 conforms to a second axis (V axis) to have a unit length, and $P_0P_1 \times P_0P_2$ is a unit vector conforming to a third axis (N axis),

a transforming matrix calculation step (B) of calculating a transforming matrix M that transforms coordinate values in an ordinary coordinate system into coordinate values in the coordinate system R;

a line segment end coordinate calculation step (C) of calculating u-, v- and n-coordinate values of the both ends A and B of the line segment;

an intersection determination step (D) of determining whether or not the line segment intersects with the triangle, on the basis of the u-, v- and n-coordinate values of the both ends A and B;

an intersection point coordinate calculation step (E) of calculating u-, and v-coordinate values of the intersection point when the line segment intersects with the triangle; ~~and~~

an intersection point determination step (F) of determining whether or not the intersection point is positioned inside the triangle, on the basis of the u-, and v-coordinate values of the intersection point; and

an output step of transmitting to an output device data to reflect (1) whether the intersection point is inside the triangle or outside the triangle, and/or (2) the coordinate values of the intersection point.

2. (Original) The method for calculating an intersection point of a triangle with a line segment according to claim 1, wherein the transforming matrix M calculated in the transforming matrix calculation step (B) is an affine transforming matrix.

3. (Original) The method for calculating an intersection point of a triangle with a line segment according to claim 1, wherein in the line segment end coordinate calculation step

(C), the u-, v- and n-coordinate values are calculated by the equation (8):

$P_{UVN} = MP_{xyz}$ ...(8).

4. (Currently Amended) The method for calculating an intersection point of a triangle with a line segment according to claim 1, wherein the intersection determination step (D) including:

(1) determining that the intersection point does not exist when one of the both ends has the absolute n-coordinate value not smaller than a length of the line segment, and/~~or~~

(2) determining that the intersection point exists when the n-coordinate values of the both ends have different signs.

5. (Original) The method for calculating an intersection point of a triangle with a line segment according to claim 1, wherein the intersection determining step (D) includes determining that the intersection point is positioned outside the triangle (1) when each of the both ends has the u-coordinate value not larger than "0" or not smaller than "1", (2) when each of the both ends has v-coordinate value not larger than "0", or (3) when each of the both ends has the u- and v-coordinate values of which sum is not smaller than "1".

6. (Original) The method for calculating an intersection point of a triangle with a line segment according to claim 1, wherein the intersection point coordinate calculating step (E) includes:

internally dividing the line segment by the n-coordinate values of the both ends A and B to determine the internally divided point as the intersection point; and

calculating u- and v-coordinate values of the intersection point.

7. (Original) The method for calculating an intersection point of a triangle with a line segment according to claim 1, wherein the intersection point determination step (F) includes determining that the intersection point is positioned inside the triangle when the u- and v-coordinate values of the intersection point satisfy three inequalities (13) of Formula 1:

- $0 \leqq u \leqq 1$ (range in a Vec_1 direction)
- $0 \leqq v \leqq 1$ (range in a Vec_2 direction) · · · (13)
- $0 \leqq u+v \leqq 1$ (inside a line P_1P_2)

8. (Currently Amended) A program, stored on a computer-readable medium, causing a

computer to calculate an intersection point of a triangle with a line segment, the triangle having three vertexes P_0, P_1, P_2, and the line segment having both ends A and B,
the program causing a computer to perform:

a coordinate system setting step (A) of setting a coordinate system R in which P_0 is a coordinate origin, P_0P_1 conforms to a first axis (U axis) to have a unit length, P_0P_2 conforms to a second axis (V axis) to have a unit length, and $P_0P_1 \times P_0P_2$ is a unit vector conforming to a third axis (N axis),

a transforming matrix calculation step (B) of calculating a transforming matrix M that transforms coordinate values in an ordinary coordinate system into coordinate values in the coordinate system R;

a line segment end coordinate calculation step (C) of calculating u-, v- and n-coordinate values of the both ends A and B of the line segment;

an intersection determination step (D) of determining whether or not the line segment intersects with the triangle, on the basis of the u-, v- and n-coordinate values of the both ends A and B;

an intersection point coordinate calculation step (E) of calculating u-, and v-coordinate values of the intersection point when the line segment intersects with the triangle; ~~and~~

an intersection point determination step (F) of determining whether or not the intersection point is positioned inside the triangle, on the basis of the u-, and v-coordinate values of the intersection point; and

an output step of transmitting to an output device data to reflect (1) whether the intersection point is inside the triangle or outside the triangle, and/or (2) the coordinate values of the intersection point.